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PLANTÆ BAKERIANÆ

By EDWARD L. GREENE

AND OTHERS.

VOLUME III.

FASCICLE I.

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ITINERARY.

Plans for the summer months of 1901 embraced an examination of the flora of the Gunnison watershed, including the region from Marshall Pass to Grand Junction, with the valleys and hills adjoining the Gunnison River and its principal tributaries. This region has a northwest and southeast extension in west central Colorado and includes areas of very diverse character, both topographical and geological, and the flora varies accordingly. The drainage area is a part of that of the Colorado River and its waters eventually reach the Gulf of California.

The region is separable into three distinct areas: The High Mountain Area, the Foothill Area, and the Desert Area. On the extreme east lies Mount Ouray and its companion peaks; to the north the Elk Mountains of numerous very high and often jagged peaks, and to the south the Cochetopa Mountains—less lofty and more often with rounded, grassy summits. The above, with that portion of the San Miguel Mountains about the headwaters of the Uncompahgre River, a tributary of the Gunnison, and the Grand Mesa, compose the High Mountain Area of this region.

All that country between Jack's Cabin, Sargent's and Lake City on the one hand, to Cerro Summit and Ridgeway on the other, may be classed as Foothill Area. This is a country of comparatively low, rounded hills and narrow valleys, the hills covered with sage brush and scattering pine and spruce, the valleys with alder, willow and cottonwood along the streams, and with frequent rich meadows.

Passing down the Gunnison, the river just below Sapinero

enters the rocky gorge of the Black Cañon. This is passable for the Rio Grande Railroad for fifteen miles to a point near Cimarron, where the Cimarron River enters from the south. Here the railroad is compelled to climb up through Cimarron Cañon and over Cerro Summit to seek a western outlet by way of the Uncompahgre Valley to Delta, which is again on the Gunnison. From Cimarron to near Delta the Gunnison runs through its Grand Cañon, so deep and narrow and with such precipitous walls as to be quite inaccessible.

Passing westward from Cerro Summit, the change in character of country and of flora is one of the most sudden and most remarkable in the State of Colorado. Cerro Summit is a huge hill covered with thickets of oak scrub and Amelanchier (scattering other shrubs) and supplied with a rich herbaceous vegetation. A few miles to the westward and a few hundred feet below, say at Cedar Creek, one is in the Desert Area, with cedars, piñon, *Sarcobatus*, *Atriplex*, and a characteristic desert flora. From this point to the west end of the Grand Mesa, the broad Uncompahgre Valley was originally almost an utter desert. It is flanked on either side with adobe hills or gravelly mesas, sparingly clothed with cedars or entirely naked, the bottoms with *Sarcobatus* and its companions, and along the stream willows and cottonwoods.

From Delta to Grand Junction the Gunnison runs through its Lower Cañon which is broader and shallower than the Grand Cañon and flanked by barren and broken sandstone hills, in some places closely resembling the Colorado Cañon formation. A collection of the curious flora of this hot, dry Lower Cañon was made within seven miles of Deer Run. At Grand Junction the Gunnison passes into the broad valley of the Grand River, which is also desert

where unirrigated. Below Grand Junction the lowest altitude in the State is reached.

In the High Mountain and Foothill* Areas the rocks are quite largely metamorphic and the soils are constituted accordingly. In the Elk Mountains near Crested Butte and Ruby there are extensive outcroppings of slate and coal. In these mountains collections were made at Crested Butte, Rogers, Keblar Pass and Ruby.

The Elk Mountains are a wonderful range of high, closely set, jagged peaks, well watered, richly clothed with spruce forests and other vegetation—undoubtedly richer in this respect than any other mountains of Colorado. They are remote, rarely visited, and together form the richest and most promising high-mountain botanical field in the State. Deep forests, meadows, open glades and parks, dripping cliffs, and springs and streams everywhere, altogether furnish a most remarkable field for plants of all groups.

Later on when our Botanical Gardens and Universities establish their substations for Experimental Ecology and similar work, there should certainly be one here.

In the High Mountain Area collections were also made at and near Marshall Pass, at Carson in the Cochetopas, at Ouray and on the surrounding hills in the San Miguels, and on the summit of the Grand Mesa.

In the Foothill Area, collections were made at Jack's Cabin, Sargent's, Doyle's, Gunnison, Iola, Sapinero, the Black Cañon, Cimarron, at Van Boxle's Ranch above Cimarron, on Poverty Ridge near Cimarron, on the Black Mesa at the head of Crystal Creek, and on Cerro Summit.

In the Desert Area collections were made at Cedar Creek, Montrose, Cedar Edge, Deer Run, and Grand Junction.

* This term may be objected to as not equivalent to the Foothills on the east slope. But neither would the Desert Area here be equivalent to the Plains on the east.

While the localities given are not many in number, still, around them and between them a good deal of ground was covered. Tramps were made around each point for a radius of several miles and most places were visited more than once during the three months. Walks were also made between Ruby and Keblar Pass, between Keblar Pass and Crested Butte (seven miles), between Crested Butte and Jack's Cabin (fifteen miles), between Marshall Pass (alt. 10,800 ft.) and the top of Mount Ouray (14,000 ft.), and to the top of Little Ouray, between Lake City (8,000 ft.) and Carson (11,500 ft.) and return (thirty-two miles), between Cimarron and top of Poverty Ridge and return (ten miles) three times, between Cimarron and the Black Mesa and return (sixteen miles), four times between Cimarron and Cerro Summit (five miles), through the fifteen miles of the Black Cañon three times, from Cerro Summit to Cedar Creek (seven miles) from Grand Mesa Lakes to Cedar Edge (seven miles), from Telluride to Ouray (twenty miles, over a divide rising to 13,500 ft.), and between Deer Run and Kanah Creek (seven miles) three times. This is over and above the local work around all the points mentioned. So the plants obtained will represent the phanerogamic flora fairly well. Getting into the field so late and doing all the work alone made it impossible to give the necessary attention to the collection of the cryptogams. But the region is rich in them. The fleshy forms were noted especially in the Elk Mountains, where they were abundant even up into the highest timber. Such fungi and mosses as intruded themselves on the attention were collected.

Two points in the subalpine country should be especially noted—the Grand Mesa and Van Boxle's Ranch. The Grand Mesa is a high elongated plateau extending northwesterly from the West Elk Mountains to the Gunnison

below Delta. It is a remarkable place. The top is well watered, with many streams and beautiful lakes and with rich forests and open parks. About the base lies the desert. The Grand Mesa can be readily reached by a twenty-five mile drive from Delta.

Van Boxle's Ranch is twelve miles above Cimarron on the headwaters of the Little Cimarron. One could scarcely find a richer or more beautiful mountain locality than this, surely not one more remote or less known. Splendid trout fishing is not one of the least of the many attractions.

Here should be detailed those plants which were observed but for various reasons were not collected. The high spruce woods were composed almost entirely of *Picea Englemanni* and *Pseudotsuga*. Along the lower border of the spruce are extensive thickets of quaking aspen, some of the trees often reaching very good size. Here, also, in favorable places bear berry (*Arctostaphylos uva-ursi*) is common. Throughout the foothill and mountain country *Alnus* was frequent along the streams, and the red-berried *Sambucus* was occasional in the higher altitudes. The scrub oak thickets so common in the foothill country have already been mentioned. Wet swales in the lower altitudes were usually filled with *Typha*, and often contained colonies of *Scirpus occidentalis*. One of the poison oaks (*Rhus*) was common in the bottoms throughout the lower altitudes, but extreme susceptibility, induced by a most troublesome experience in the swamps near Mobile, Alabama, led me to give it a wide berth. Again cattle were seen browsing it, apparently with relish. *Helianthus petiolaris*, *Plantago major*, *Salsola kali*, *Solanum nigrum*, *Xanthium strumarium*, *Amarantus blitoides*, and *A. retroflexus*, occurred on almost all cultivated areas, along roads and railroads, and in railroad yards. In the Gunnison Valley the Russian Thistle

is almost entirely confined as yet to the yards and along the right of way of the railroad. The section men have instructions to destroy it, but it was found that few of them were acquainted with it. In its younger states it is soft and succulent, and cattle and horses eat it freely. *Humulus lupulus* occurs occasionally in the bottoms, and a few plants of *Panicum crus-galli* were seen at Grand Junction. *Cereus phoeniceus* and one of the ordinary yellow-flowered prickly pears are common throughout the foothill country. On gravelly hillsides in the Desert Area, *Opuntia arborescens* is not uncommon. *Phleum alpinum* and *Poa alpina* were abundant throughout the alpine region. A few immature plants of *Melica bulbosa* were seen on Poverty Ridge. Above Ouray a few plants of *Artemisia franserioides* were observed.

The agricultural possibilities of this region as it is described above would not appear very promising. On the contrary, they are very great. Even the naked adobe soil possesses a wonderful fertility and requires but water to make it yield richly. Even now there are ranches where small ditches could be taken out, all along the Gunnison except in the narrow cañons, and likewise along the Uncompahgre. Near Crested Butte (8,878 ft.) the altitude is too great for common garden vegetables and fruits, but the natural meadows in the vicinity, full of native grasses and sedges, have been improved and produce heavily. At Jack's Cabin (about 8,300 ft.), fifteen miles below Crested Butte one may see beautiful fields of alfalfa and timothy, and here are raised radish and lettuce and other very hardy and quickly maturing garden vegetables. Sargent's (between Gunnison and Marshall Pass) is much like Jack's Cabin in this respect. Doyle's, between Gunnison and Sargent, was found to be a very interesting locality on account of the considerable percentage of alkali in the bottom's soil. The meadows here

were consequently not as rich and were overrun with the worthless, even injurious, grass locally known as "fox-tail." A number of distinctly halophytic plants were present such as *Triglochin maritima* and a *Plantago*.

At Gunnison (7,680 ft.) are some beautiful meadows, though many are filled with a most astonishing array of native plants. When these are in bloom, the *Erigerons*, *Pedicularis*, *Castillejas*, *Crepis* and many others, present a very beautiful sight. Barley, oats and red clover do well here, and better examples of radish, lettuce, carrots, turnips, potatoes, rhubarb, cabbage, etc., would be hard to find. It is probable that some of the small fruits would prove a great success at this point.

Coming down out of the foothill country and entering the desert above Montrose, one finds beautiful orchards and broad green fields where the ground has been irrigated, and portions now have the appearance of a prosperous agricultural district. It is, however, near Delta (about 5,000 ft.) and neighboring towns that the fruits are grown to greatest perfection. Here are produced pears, peaches, apples, plums, cherries and other fruits which cannot be excelled. Grand Junction is also the center of a great fruit country.

There is, in this Gunnison region, a vast natural supply of water from the high mountains and vast areas of land which that water may yet be carried to in ditches, so that the possibilities before the region are almost unlimited. The day is coming when the lower Gunnison valley, now largely a desert, will be one of the richest agricultural regions in the United States.

Thousands of sheep are pastured during summer in the lower foothills. Higher up many cattle may be found, though there is rich unoccupied range for many times the number now there.

The field work, all done between June 1st and September 1st by one person, resulted in the collection of above 25,000 specimens with notes on each species. Also, photographs were taken of all the characteristic ecological associations. As in previous years the work would have been largely impossible but for the co-operation and encouragement of Dr. E. L. Greene, whose remarkable knowledge of the American field directed operations in these most remote localities, even to definite hills, valleys and meadows.

Here also should be acknowledged the great kindness of Mr. E. T. Jeffery, President of the D. & R. G. System, and of other officials of the Road, without whose assistance some of the work would have been quite impossible. A faithful boy, Ed. Dundin, did the camp work, and most of the changing of driers, though the work of first, putting plants into press, taking out those finally dried, cleaning, bundling, writing labels and separating a study set, necessarily devolved on the collector.

CARL F. BAKER.

Stanford University, California.

15 Oct., 1901.

EXPLANATORY.

Mr. Bakers' botanical exploration of the Gunnison Watershed in the summer of 1901, has already proven a remarkable success, both as to the number and quality of the specimens; while the wealth of new species is even greater, I think, than was obtained in other sections of southern Colorado either by Mr. Baker in 1899, or by Baker, Earle and Tracy in 1898. Many of the new things in those two earlier collections are still unpublished; this being largely due to my having undertaken to publish full lists of those collections, and in due taxonomic sequence.

Pending the completion of volumes I and II of the *PLANTÆ BAKERIANÆ*, I propose giving, as a first instalment of volume III a somewhat miscellaneous congeries of paragraphs dealing with new or otherwise interesting species; in this absolving myself from the obligation—more fanciful than real—of following any particular sequence of Families. Any difficulty which this want of order may seem to entail upon students of the sets, will be obviated by an index to the genera treated, if not even to the species.

EDW. L. GREENE.

Catholic University of America.

21 Oct., 1901.

RANUNCULACEÆ.

RANUNCULUS EREMOGENES, Greene, Eryth. iv. 121. Abundant in a small pond within the Black Cañon, n. 204; quite typical. In publishing this interesting analogue of

the Old World *R. sceleratus*, I credited it to no station more southerly than middle Colorado. The present record would therefore be a considerable extension of its range. But my herbarium shows that I myself collected it in 1889 as far south as Trinidad, on the extreme southern verge of Colorado. Mr. Heller has more recently distributed it from Rio Arriba Co., New Mexico; and I may here note that in 1898 I found plenty of it along the muddy margin of a lake in southern Minnesota not far from Windom, this being its most easterly habitat so far as known.

RANUNCULUS EREMOGENES, var. *PILOSULUS*. Much smaller than the type, with several subequal ascending stems 5 or 6 inches high; herbage of a deeper green and sparsely pilose-pubescent; receptacle, heads and achenes much as in the type, but all smaller.

In damp places above Gunnison, 17 July, n. 454. Quite different, except as to height and mode of growth, from my var. *degener* of the same species.

RANUNCULUS PURSHII, Richardson. Fine large specimens, growing in ponds near Gunnison, n. 669; differing from the high-northern type in failing to show the very narrowly dissected submersed leaves. A so-called "*R. Purshii*" of Mr. Baker's collecting at Fort Collins, Colo., in 1896 is clearly *R. eremogenes*.

RANUNCULUS UNGUICULATUS, Greene, Pitt. iv. 142. Two numbers of this, both from the Grand Mesa; 228, much smaller than the type specimens and too young; 234 is more mature, and large enough to represent the species well.

RANUNCULUS OREOGENES. Of the size and habit of *R. ellipticus*, with even larger and coarser roots, but foliage of dif-

ferent form and texture, being much firmer and scarcely succulent, the lowest leaves narrowly ovate-lanceolate, those next succeeding them linear-elliptical, the blades about $1\frac{1}{2}$ inches long, the petioles about as long, the mostly solitary cauline like the others but closely sessile, all vivid-green and reticulate-venulose above, pale beneath, even whitish, all perfectly entire; scapiform peduncles decumbent, simple and 1-flowered, or with one or two 1-flowered branches: calyx and corolla not seen: head of achenes ovate; achenes pubescent, the body suborbicular, the beak rather prominent, curved.

At Cerro Summit above Cimarron, 7 June, n. 50; occurring on open hillsides, but past flowering.

In addition to the above, the collection exhibits the following less noteworthy Ranunculi: *R. reptans*, Linn., n. 464; *R. inamænus*, Greene, nn. 235, 350; *R. Macounii*, Britt., n. 562, and *R. Macauleyi*, Gray, n. 319.

BATRACHIUM TRICHOPHYLLUM, Bossch., n. 320.

CYRTORHYNCHA RUPESTRIS. Stems very slender and few-flowered, more than a foot high; biternate foliage ample and of more than half the height of the stems; flowers mostly only 5 or 6, on long slender pedicels and very small: petals about 5, variable, some obovate and sessile, others (transitional to stamens) with smaller blade and long claw: achenes few, short and of almost elliptic outline, the ribs prominent, but more or less confluent and inclined to form narrow reticulations.

On moist cliffs in the Black Cañon, 20 June, n. 198. An excellent new species of an interesting genus, this has the aspect of *C. neglecta*, of northern Colorado, but not at all either its flowers or fruits.

CALTHA CHIONOPHILA, Greene, Pitt. iv. 80. Two representations of this; n. 227, from the Grand Mesa, shows constricted but not dentate foliage, while n. 408, from Carson, has the leaves smaller, more rounded, and notably dentate.

TROLLIUS ALBIFLORUS, Rydb. Fl. Mont. 152. Under n. 221 we have excellent flowering specimens of this fine plant which Mr. Rydberg has well separated altogether, in name and rank, from *T. laxus*.

DELPHINIUM NELSONII, Greene. On open hillsides at Cerro, n. 52, the usual form; n. 216, the largest and most showy specimens yet seen, said to be abundant in open parks at Van Boxle's, above Cimarron.

DELPHINIUM DUMETORUM. Near the last, but more slender and commonly 2 feet high or more; leaves remote and with fewer and broader segments; herbage glabrous; ramifications of the root more slender and disconnected: flowers smaller and less widely expanding, though with spur longer and more slender, acutish and strongly curved downward at the end, the color of the whole flower a pale lavender-blue: follicles puberulent, shorter and more widely spreading than in *D. Nelsonii*.

On dry hills, among shrubbery above Cimarron, 6 June, n. 35; growing quite apart from *D. Nelsonii*, which occupies open grassy ground at higher elevations.

DELPHINIUM QUERCETORUM. Resembling *D. glaucum*, perhaps as tall, with equally leafy stem and narrow condensed raceme; herbage pale and glaucescent, but only the stem and petioles truly glabrous, the leaves villous-puberulent, their 3 to 5 segments broad-cuneiform and 3-lobed, not toothed; rachis of the spike strongly hirtellous, the pedicels

most so, and the hairs of these viscid and mostly gland-tipped: small flowers very dark blue-purple, the sepals rugulose and together with the slender-conical turgid straight ascending spur rather rough-hairy: ovaries densely villous.

Common among oaks at Cerro, 12 July, n. 412. At first glance this appears much like true *D. glaucum*, though the leaves are much less divided than is usual in that species, and the flowers are much darker; but a lens reveals the abundant short-hairiness of the foliage; and the even stronger pubescence of the rachis is of a character quite peculiar. Moreover, this is a dry-land plant, whereas *D. glaucum* grows only in wet places.

ACONITUM BAKERI. Stem stoutish, erect, simple and rather strict, 2 feet high, the whole upper portion of the plant, even to the flowers, villous hirsute with brownish hairs, some of them gland-tipped: lower parts glabrous, the lowest leaves 5-parted and the cuneate divisions doubly about 3-cleft: raceme compact: hood $\frac{3}{4}$ inch high, the galeate portion rounded, scarcely higher than broad, much shorter than the downward portion, the beak broadly subulate, projecting horizontally; follicles about 4, glabrous.

At 10,000 feet near Marshall Pass, 19 July; said to be common in wet places. The only American species with dense almost spicate and strict inflorescence, the sepals and petals remarkably pubescent. It is the only Aconite of this year's collection.

CRUCIFERÆ.

DRABA GRAMINEA. Perennial, the much branched stems 3 to 5 inches high, the older portions thickly clothed with long dry chaffy remains of the leaves of other seasons: leaves of the season linear and grassy, almost as long as the

short-peduncled loose and rather few-flowered racemes, glabrous above the middle, but below it loosely ciliate with simple hairs: sepals yellow; petals pale-yellow: filaments abruptly and widely dilated at base; young pods ovate, acute, surmounted by a conspicuous style, few-ovuled.

A most remarkably chaffy and grassy-looking *Draba* of alpine habitat, found near Carson, 2 July, n. 296. Its nearest affinity would seem to be *D. chrysantha*.

DRABA OXYLOBA. Perennial, tufted, the several and quite simple flowering stems or branches decumbent, leafy to near the middle, thence racemose, 8 to 18 inches high; foliage and stem not at all canescent, scarcely even pale, nevertheless roughened everywhere by an sparse indument of sessile and uniformly 4-parted hairs: basal leaves 1 to 2 inches long, oblanceolate, petiolate, remotely dentate or else entire, the petioles, at least near the base, with a few scattered marginal simple and setaceous hairs; cauline leaves ovate to oblong-lanceolate, commonly near an inch long, sessile, dentate: sepals and petals both golden-yellow, the former with scattered short mostly simple (rarely forked) hairs: pods not twisted, oblong-linear to elliptical, 4 or 5 lines long, acute at each end, pointed with a style of less than one line; pedicels slightly ascending, longer than the pods.

At Van Boxles' Ranch above Cimarron, in open parks, n. 382; also at Sargents, in meadows, n. 351; distinguished from all its allies by a pubescence of cruciform hairs.

DRABA BAKERI. Rather slender yellow-flowered perennial, the several erect stems 4 to 10 inches high: tufted radical leaves about an inch long, oblanceolate, short-petiolate, entire, acutish, cinereous, at least when young, with

stellate pubescence, the stem and inflorescence greener, the pubescence more sparse, mostly of forked or 3-branched hairs, but with some much longer and perfectly simple ones interspersed: cauline leaves lanceolate, serrate-toothed, sessile: fruiting raceme loose, with leafy bracts subtending the lower pedicels: flowers small; sepals green, notably bristly-hairy at apex; petals yellow, scarcely twice the length of the sepals: pods erect, short-pedicellate, narrowly elliptical, pubescent on the face with more or less forked and appressed hairs, but the margins quite hirsutulous with mostly simple ones: style short.

Near the limit of trees, in the mountains near Carson, n. 316. An ally of *D. streptocarpa*, the pods doubtless more or less twisted when mature.

DRABA NITIDA. Annual, very erect and strict, simple or with a few shorter racemes from near the base, the whole plant often 10 to 14 inches high, racemose almost from the base, and, except at base, glabrous, deep-green and shining: leaves in a comparatively small radical tuft, the longest barely an inch long, oblong-lanceolate, obtuse, entire, the outer narrowed at base but hardly petiolate, sparsely sub-stellate-pubescent, the margins loosely bristly-ciliate; cauline few, oblong-ovate, entire, sessile: pedicels 3 or 4 lines long, ascending, the oblong-linear acutish often somewhat incurved glabrous pods about as long: flowers small, yellow, the green sepals more or less pilose, as is also the base of the stem: style none.

Abundant on moist open ground at 10,000 feet above Marshall Pass, 19 July, n. 492. A less luxuriant state of the same was collected, also by Mr. Baker at Cameron Pass, northern Colorado, at 9,800 feet, in July, 1896. The plant is one which has been referred erroneously to *D. stenoloba*.

ARABIS DEMISSA. Low and slender, the racemose stems or peduncles only 5 to 8 inches high, but the caudex large in comparison, stout and lignescent, not branched, or the branches not obvious, bearing a dense tuft of very narrowly oblanceolate glaucescent leaves, which are glabrous except for a few setose hairs on the margin at the base of the petiolar portion: peduncles several, with 2 or 3 subauriculate sessile bracts below the raceme, this (seen in fruit only) loose, the purplish and glaucous pods narrowly linear, 1 to $1\frac{1}{4}$ inches long, deflexed on very short pedicels: seeds in one row, suborbicular, not winged, though with more than the hint of a scarious margin on at least one side.

A few specimens of this interesting and strongly characterized new species were gathered from among the stones of a dry river bed near Cimarron, 4 June. They bear the number 16 of the collection, but are not in quantity for distribution in the sets.

ARABIS STENOLOBA. Suffrutescent as to the branching caudex, the slender flowering stems less than a foot high, tufted basal leaves and those of sterile branches of the caudex oblanceolate, entire, less than an inch long, both faces hoary with a minute stellate tomentum: floriferous branches with scattered small leaves below the raceme, this short and few-flowered; sepals purplish, stellate-pubescent, as are also the pedicels and the stems, petals white, twice the length of the sepals: pods very narrowly linear, 1 to $1\frac{1}{2}$ inches long, obtuse, glabrous, suberect on almost filiform pedicels of $\frac{1}{4}$ to $\frac{1}{2}$ inch.

On stony hillsides above Cimarron, n. 21. Plant with much the habits and foliage of *A. eremophila*, but the pubescence different, the fruit more so.

THELYPODIUM BAKERI. Biennial, with several widely

divergent stems from amid the tuft of spreading basal leaves; herbage glabrous, except some hirsute hairiness at base of stem, and very glaucous: radical leaves petiolate, cauline numerous, narrowly cordate-ovate, sessile and clasping, entire, an inch long or more: flowers white, the greenish sepals somewhat spreading, the petals with broad claw and spreading spatulate-obovate limbs: spreading pedicels of the pod very slender, the pod itself narrow, not stipitate, an inch long or more.

Stony hillsides at Cimarron, 6 June, n. 32. This is a very near ally of Miss Eastwood's *T. aureum*, but its flowers are white, and the pods are not stipitate.

THELYPODIUM LILACINUM. Biennial, two or three feet high with rather many ascending branches from near the base, all racemose at the end; herbage deep-green and glabrous; basal leaves 2 or 3 inches long, spatulate-oblong, entire or repand, cauline reduced, lanceolate to nearly linear: flowers corymbosely crowded, but the raceme lengthened in fruit to 4 or 5 inches; sepals erect, rich lilac-purple, of less than half the length of the spatulate-linear petals, these at first white but soon changing to the lilac of the sepals: pods slender, torulose, $1\frac{1}{2}$ inches long, scarcely stipitate, slender-beaked.

At Doyle's, n. 635. Related to *T. integrifolium*, but of different habit, with different inflorescence, and peculiarly handsome flowers.

VIOLACEÆ.

Only the genus *Viola* is represented; but that in an interesting array of species by far the greater number of which are absolutely new.

V. CANADENSIS, Linn., n. 383.

V. RETROSCABRA, Greene, Pitt. iv. 290, very recently published, is represented by the two numbers 68, 144, both from near Cimarron. This and the three new ones next succeeding are of the natural group represented by the Old World *V. canina*.

V. STENANTHA. A multiclital and cæspitose dwarf, forming mats 2 or 3 inches broad, little more than 1 inch high; herbage very minutely and sparingly scabro-puberulent, the angles of the petioles more obviously and retrorsely so: leaves deltoid-ovate to oval, little more than $\frac{1}{4}$ inch long, rather fleshy, lightly crenate, usually tapering, though abruptly, to the petiole: peduncles about equalling the leaves, bearing conspicuous subulate-linear bractlets near the flower, sepals large for the flower, oblong-linear, acute, glabrous, not scarious-margined: corolla dark-blue, about 5 lines long including the very long and narrow somewhat hooked spur, very narrow, the petals not widely expanding, the keel broad, the others narrow.

On the Grand Mesa, 23 June, n. 230. A species very well characterized by its long and narrow long-spurred dark-blue corolla.

V. DEMISSA. Scarcely larger than the last, but rhizomatous, the rootstocks chaffy with the persistent sere and brown stipules of a preceding year: leaves $\frac{1}{4}$ inch long, on petioles of about an inch, round-ovate to deltoid-ovate and oval, crenate, glabrous: peduncles much exceeding the leaves, bibracteolate towards the middle: sepals oblong-linear, acute; corolla nearly $\frac{1}{2}$ inch long including the long obtuse cylindric spur, the petals subequal, widely expanding, violet above the middle, white below, and marked with purple veins.

In moist grassy depressions at 12,000 feet above Marshall

Pass, 19 July, n. 501. What is probably the same alpine or subalpine violet was collected by Mr. Baker at Cameron Pass in northern Colorado, as long ago as 1896. It is also represented in C. S. Sheldon's n. 277, obtained at Berthoud Pass in middle Colorado, 16 Aug., 1884.

V. INAMÆNA. Slender, glabrous, or the peduncles and petioles obscurely and retrosely hirtellous; stems several from the slender roots, but not much developed, often 1 or 2 inches long, greatly surpassed by the petioles and leaves, the plant thus appearing almost acaulescent: leaves round-ovate, obtuse, notably cucullate, lightly crenate; stipules subulate-linear, lacerately subpinnatifid: flowers seemingly always, even the earliest, short-pedunculate and apetalous, the small ovoid capsules deflexed.

In low meadows along the river at Gunnison, 25 July, n. 603. The species seems nearly related to *V. retroscabra*, though the leaves are not only glabrous but more rounded and cucullate, while in the apetalous character of the flowers, and in form of the fruit, it connects with *V. physalodes*. I also provisionally refer here a plant collected by Mr. Baker at Cameron Pass, northern Colorado, 15 July, 1896, though its leaves are less rounded and not cucullate.

The three species next succeeding are of the yellow-flowered group of caulescent violets.

V. GOMPHOPETALA. Allied to *V. Nuttallii*, the crown of the root-bearing few and very short depressed leafy and floriferous branches; the whole plant light-green, with ciliate leaves, and their veins pubescent: leaves from round-ovate in the earliest, to oval and oblong-oval or oval-lanceolate, the longest $1\frac{1}{2}$ inches long, somewhat repand-denticulate or subentire, marked underneath by fine light almost parallel veins or nerves, the petiole as long as the blade, slightly

winged above: peduncles 3 inches long, surpassing the leaves: sepals linear-lanceolate, acute, glabrous: corolla about $\frac{3}{4}$ inch wide, of rounded circumscription, the petals cuneate-obovate, very obtuse or almost truncate at the broad apex, all brown without, yellow within.

On open hillsides of the Grand Mesa, 23 June, n. 225.

V. PHYSALODES. Low, slender, the foliage very thin and the whole plant glabrous, sparsely leafy ascending stems well developed, 2 or 3 inches long, short-jointed and with a flower in each axil: leaves from subcordate-ovate to oval, obtuse, almost or quite entire, $\frac{3}{4}$ to $1\frac{1}{4}$ inches long, obviously veiny only beneath; pedicels barely an inch long in fruit, slender, deflexed: flowers minute, apparently always apetalous; pods also very short, subglobose or obovoid.

In thickets along the Cimarron River, 7 June, 1901, n. 67. The least showy, but by far the most interesting violet of all those which it has fallen to my lot to describe as new. The whole plant by its thin entire glabrous leaves, and numerous fruiting pedicels, always deflected beneath the leaves, give the species a singular likeness to some possible small *Physalis*. Though seeming to be altogether apetalous, I nevertheless see in it a member of that yellow-flowered group, of which *V. Nuttallii* is typical.

V. BITERNATA. Leafy stem not well developed at first, only 1 or 2 inches long, but subradical leaves very long-petioled, upright, 5 or 6 inches high, the peduncles of the few and early petaliferous flowers about as long: leaves very ample, palmately or sometimes subpinnately biternate, the primary divisions broadly cuneiform, deeply trifid and their segments coarsely and deeply tridentate, all the segments and teeth obtuse, the margins ciliolate and veins pubescent with short bristly appressed hairs: corolla $\frac{3}{4}$ inch broad, all the petals

obovate, obtuse, brown without, yellow within, the keel nearly twice the width of the others: small apetalous flowers many along the at length well developed stem, the capsules succeeding these large, round-obovoid, on deflexed pedicels 1 or 2 inches long.

Related to *V. Sheltonii* of the far Northwest, but very different. The specimens, from two localities, collected in June, 1901, are numbered 42 and 233.

POLYGONACEÆ.

POLYGONUM MONTANUM. *P. Douglasii*, var. *latifolium*, Greene, Bull. Calif. Acad. i. 125. *P. Douglasii*, var. *montanum*, Small, Polyg. 118. Low, fastigiate branched from the base, 3 to 6 inches high, the branches floriferous from the base, but the flowers few among the proper leaves, most of them forming a mere bracted spike beyond the foliage, all the angles of stem and branches denticulate-scaberulous, and other parts also more or less scabro-puberulent: leaves oblong-lanceolate, very acute, often an inch long, 1-nerved, the nerve sharply carinate beneath the leaf: fruiting perianth subsessile but nodding, its segments dark green or purplish except marginally and completely enclosing the achene, this black, smooth and shining, the faces obtusely rhomboidal, the cross-section 3-lobed rather than triangular.

The above description is drawn from a series of specimens collected by Mr. Baker this year at Marshall Pass, 20 Aug., and to be distributed under n. 893. These specimens represent perfectly what I had in mind when naming *P. Douglasii*, var. *latifolium*. But in the lapse of sixteen years, other things have become confused with this in my own and other herbaria, some of which are now to be segregated. Habitally, as well as in its general dimensions, *P. montanum* much more nearly approaches *P. Austinæ* than *P. Douglasii*;

and in this, as well as in a few but very constant characters it may well claim specific rank.

P. COMMIXTUM. Near the last but dwarf, 2 or 3 inches high, more herbaceous and with even ampler and more copious leafiness, the bracted spikes very short and dense; leaves and stem glabrous, the former from oval and even rhombic-ovate to oblong, mostly obtuse but with an abrupt sharp point, the midvein conspicuous, some secondary veins more or less obvious as diverging from it: perianths green, their segments with white or purplish margins, more widely expanding in flower and more loosely investing the longer and partly protruding achene, this more elongated than in the last in proportion to its thickness, dark and shining.

The only specimens known to me of this are of Mr. Baker's collecting as long ago as 1896 in northern Colorado. One sheet is from Grizzly Creek, 24 Aug., the other from Cameron Pass, 10,000 feet alt., 13 Aug., both called by him *P. Douglassii latifolium*. The most notable characteristic is the narrow and partly exserted achene. This, with the dwarf stature, broad venulose leaves, and the excessive leafiness, seem to mark it as a good subspecies.¹

¹A study of the above Bakerian plants has lead to the detection of another new species nearly allied, namely:

P. HOWELLII. Sparingly branched from the base, but the few branches quite erect and contiguous, almost equably leafy to the summit and sparsely floriferous throughout, more scabrellous than *P. montanum* on all the angles; herbage of a paler and rather yellowish green: elliptic-oblong leaves very acute, thinnish and not inclined to be revolute, their thin margins serrulate-scabrous: ocreæ more scarious and almost fimbriate: perianths few, erect both before and after flowering, though not sessile: achenes wholly included and closely invested, very black and highly polished, the face rhombic-ovate, i. e., broadest, and rather abruptly so, much below the middle.— Known to me only from Mr. Howells' specimens taken in the Siskiyou Mountains, northern California, 8 July, 1887, and distributed for *P. Douglassii latifolium*.

RUMEX BAKERI. A yard high, the stems solitary or several, from a deep-seated taproot parted below into coarse fleshy-fibrous branches and with some more slender ones radiating around the crown of the main root: leaves, thin, glabrous, the basal ones with lanceolate-cordate blade 8 or 10 inches long on a petiole nearly as long, the cauline lance-linear, short-petiolate, those of the long and rather narrow panicle linear-acuminate, subsessile, 3 or 4 inches long, deflexed: fruit small (barely two lines wide), deltoid-suborbicular, very obtuse, grainless, delicately (but under a lens very distinctly) pinnate-veined, the veins running into a distinct favose reticulation toward the margin, but the margin itself thin, nerveless, either entire or obscurely somewhat crenate.

Common in wet meadows about Gunnison, 22 August, n. 903, seeming related to *R. polyrhizus* of the more northerly mountains.

ERIOGONUM CHLORANTHUM. Near *E. flavum*, but more widely cespitose, the many branches of the caudex relatively much more elongated and densely invested throughout with the remains of the foliage of former years; leaves much thinner, spatulate-oblong, obtuse, hoary-tomentose beneath, glabrate above, nearly $1\frac{1}{2}$ inches long: scapiform peduncles both slender and short, little surpassing the leaves, or even scarcely equalling them: involucre solitary, many-flowered, the flowers rather large, the cluster almost $\frac{3}{4}$ inch broad: perianths greenish-yellow, the segments equal, the tube villous, acute at base but not stipitate.

On stony alpine slopes of Mt. Ouray, forming large mats, 20 August, n. 853.

ERIOGONUM BAKERI. Allied to *E. flavum*, rather taller,

the branches of the caudex very slender and only loosely leafy, the leaves thin, the elliptic-lanceolate blades $\frac{1}{2}$ to 1 inch long, on slender petioles much longer, white-tomentose beneath, sparsely villous above: scapiform peduncles 5 to 8 inches high, erect, slender; inflorescence of a sessile involucre and 1 to 3 dichotomous peduncles from its base, the whole number of involucre thus 7 to 9, all turbinate: perianths yellow, small, very long-stipitate, silky villous, the inner segments much longer than the outer, all obovate, obtuse.

Black Cañon, 1 Aug., n. 696. Said to be cespitose in rather small tufts. The inflorescence is like that of *E. Jamesii*, though far less ample; and the real affinity is with *E. flavum*.

ERIOGONUM SALICINUM. Allied to *E. microthecum* and *E. Simpsonii*, the tufted woody stems and long corymbose paniced peduncles together more than a foot high: blade of leaf lanceolate or oblong-lanceolate, about $1\frac{1}{2}$ inches long, the petiole little more than $\frac{1}{2}$ inch, stem and lower face of leaves white-tomentose, surface glabrate: the long peduncles perfectly glabrous and very glaucous: corymbose panicles loose, diffuse, 8 to 10 inches broad: involucre very numerous, small and few-flowered, broadly turbinate or subcampanulate, 5-toothed, the teeth erect, woolly within: perianths less than a line long, segments oblong, obtuse, white.

Habitat of the last; n. 375. The species would not easily be distinguished from *E. Simpsonii* but by its broad and short thin leaves.

ASCLEPIADACEÆ AND APOCYNACEÆ.

ASCEPIAS SPECIOSA, Torr. Grand Junction, 11 June, n. 251.

ASCLEPIAS HALLII, Gray. Excellent specimens of a plant that is rare; obtained at Gunnison, 25 July, n. 595.

APOCYNUM AMBIGENS. Intermediate between *A. androsæmifolium* of the East and *A. pumilum* of the Pacific slope; smaller than the former, more erect and more copiously floriferous, the corollas larger but still campanulate; folicles much shorter and thicker.

In the Black Cañon, 20 June, n. 202; also at Rogers', 14 Aug., n. 799. The plant is frequent in several parts of Colorado, and has passed for *A. androsæmifolium*; but both this and *A. pumilum* are better accepted as fair geographical subspecies.

APOCYNUM CANNABINUM, Linn. In moist ground on Deer Run, 10 June, n. 80.

APOCYNUM LIVIDUM. Several feet high, with the pale and glaucescent hue of *A. cannabinum*, but the oblong-ovate mucronate leaves much larger and more spreading: inflorescence consisting, as in that species, of terminal and naked cymes, but flowers few, large and nodding, of a pale flesh-color; sepals thin and whitish, triangular-lanceolate, erect, half as long as the corolla, this campanulate, rather deeply cleft and with spreading or recurved segments.

Common on railway embankments in Black Cañon, 8 July. The plant recalls the Californian *A. floribundum*, but differs in having few and large flowers rather than almost innumerable small ones.

ASPERIFOLIÆ.

MERTENSIA CONGESTA. Tufted stems a foot high or less, stout and rather succulent, ascending; whole herbage of a

light and rather vivid green and, to the unaided eye seeming glabrous: leaves many and ample, from elongated-ovate to broadly oblong, obtuse, or some even retuse, the cauline sessile, the radical short-petioled, all 2 to 3 inches long, minutely and sparsely strigose above, glabrous beneath: flowers many, mostly in a single condensed terminal cluster, those of the few subterminal branches similarly crowded, the pedicels very short: calyx deeply cleft into ovate acute or broadly lanceolate segments, these strongly hirsute-ciliate and, in maturity, traversed by a very prominent light-colored midvein: corolla deep-blue, about 4 lines long, the cylindric tube and campanulate limb about equal: nutlets acutely ovate, brown when mature and indistinctly sinuate-rugulose.

On Poverty Ridge, near Cimarron, 13 June, in open parks, n. 129; also at Cerro Summit, a smaller plant, n. 62.

MERTENSIA LATERIFLORA. Stems tufted, rather strict and very leafy, a foot high or more, the whole plant canescently silky-strigulose: leaves almost crowded on the stem from base to summit, oblong-linear, acutish, about 3 inches long: short cymose flower-clusters in all the axils from near the middle of the stem, on pedicels of about an inch long, the lower not equalling, the uppermost little surpassing the leaves: calyx small, completely divided into short-lanceolate scarcely acute segments, these strongly appressed-villous and ciliate: corolla of a light-blue, small, hardly 4 lines long, the limb only distinctly shorter than the tube.

Said to be common at 9,000 feet, above Carson, where it forms large clusters, in flower 2 July, n. 334. Species certainly resembling *M. linearis*, but a much larger plant than that, and with smaller flowers, the pubescence, however, being totally different. The inflorescence is peculiarly long, narrow and secund.

MERTENSIA CYNOGLOSSOIDES. Stems depressed, $1\frac{1}{2}$ feet long, sparsely and very amply leafy, the herbage delicate in texture and of a vivid green: lowest leaves oblong, obtuse, 4 or 5 inches long, on slender petioles of equal length, the cauline ovate-lanceolate, acutish, sessile by a subcordate-clasping base, these also 3 or 4 inches long and spreading, all very thin, glabrous beneath, sparsely but strongly scabrous above and scabrous-ciliolate: racemes few and sparse, long-peduncled, the upper part of the peduncle and the pedicels sparsely setose-hispid: sepals small, lanceolate and ovate-lanceolate, obtusish, hispid-ciliolate, otherwise glabrous: corolla light-blue, almost funnelform, the short and rather broad tube quite exceeded in length by the campanulate limb into which it gradually passes: nutlets white (perhaps immature), ovate, incurved at summit, turgidly and very irregularly rugose.

On moist ledges in the Black Cañon, 20 June, n. 191. A remarkably distinct species.

MERTENSIA MURICULATA. Of the size of the last, nearly, and like it almost prostrate, but of firm texture and glaucescent: lowest leaves elliptical, the blade 3 or 4 inches long, the petiole shorter; cauline ovate and lance-ovate, $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long, sessile and partly clasping, all finely dotted above with white pustules developing centrally a low, stout white scabrous point, the margin scabrous-ciliolate with short pustulate hairs: flower-clusters in all the leaf-axils, long-peduncled, somewhat crowded, not obviously racemose: sepals very short, deltoid-ovate to shortly triangular-lanceolate, obtuse, setulose on the back and strongly hispid-ciliate: corolla short and funnelform: nutlets ovate, straight and erect, lightly rugulose and minutely tuberculate.

Habitat of the last, and manifestly allied to it, though its firm texture, peculiar pustulate roughness, as well as the

differences in inflorescence, calyx and achene, preclude the confusing of them. It is Mr. Bakers' n. 193.¹

OREOCARYA HORRIDULA. Low multicapitous perennial, the not stout rather loosely leafy and floriferous stems 4 to 7 inches high, the whole plant strongly setose-hispid: obovate obtuse upper end of the leaf tapering spatulately to a rather long and narrow petiolar base: racemose short branches of the loose and short inflorescence linear-bracted, but the bracts barely equalling the calyx; this in fruit $\frac{1}{2}$ inch long, its linear and narrow segments covered with hispid hairs; corolla white, rather more than $\frac{1}{2}$ inch long, with narrow tube and small spreading limb: nutlets (only one, usually) narrowly ovate, erect and straight, sharply

¹ The characters of two northwestern *Mertensias* may here be given:

M. SYMPHYTOIDES. Stout, erect, barely a foot high, leafy to the summit and even throughout the broad cymose-panicled inflorescence with large elliptic-lanceolate acute leaves, these of a bright green and appearing glabrous, but sparsely somewhat tuberculate-scabrous, especially on the margin and the lower face: leafy cyme rather lax; calyx rather small, deeply cleft, the segments ovate-trigonal, acute, glabrous except as to the margin, this very shortly and almost obscurely scabrous-serrulate: corolla $\frac{1}{2}$ inch long, quite tubular, the upper portion quite cylindric and little shorter than the proper tube: nutlets rather coarsely low-tuberculate.—Known to me only from Emigrant Springs, in the lava beds of Modoc Co., California, where it was collected by Mrs. R. M. Austin, 20 June, 1894.

M. STENOLOBA. Size of the preceding, quite as leafy, but the leaves oblong-lanceolate, acute, thin and quite glaucous, sparsely scabrous, most so marginally: inflorescence as in most species: calyx parted into narrowly lanceolate-acuminate long segments, their margins sparsely setose ciliate: full grown nutlets scarcely half as long as the calyx and sinuate-rugose.—Based Mr. Flodman's n. 752 from the Bridger Mountains, Montana (as to the specimens in my set), and named by Mr. Rydberg "*M. lanceolata*, DC." But it can have no intimate connection with Pursh's type on which the species was founded; for that has a "short calyx," while here that organ is rather extremely elongated.

margined, the oack showing a few irregular rugæ and some interspersed tuberculation.

Deer Run, 11 June, on a dry bank; n. 133.

OREOCARYA NITIDA. Multicipitous, slightly woody at base, the stoutish stems a foot high, copiously leafy at base, the leaves 2 to 4 inches long, oblanceolate, acute, tapering to a long petiolar basal portion, this again dilated at the insertion, both faces equally silvery-silky or satiny, without other pubescence: flowers copious, in a loose open thyrsus of close racemes: calyx in fruit $\frac{1}{2}$ inch long, the segments narrowly linear except at the broad base, clothed throughout with a dense white villous tomentum and some interspersed setose-hispid hairs; corolla $\frac{1}{2}$ inch long or more, with very narrow tube abruptly widening to form a short throat, the proper limb three lines broad, the color of the whole apparently white: nutlets (mostly solitary) large, ovate, straight and erect, dark-brownish, closely covered with a minute whitish almost muricate tuberculation.

In dry stony ground at Deer Run, 11 June, n. 95. A species noteworthy by the whiteness and softness of its almost satiny indument.

Other *Asperifoliæ* of the collection are *Cryptanthæ Fendleri*, Greene, n. 780; *C. crassisepala*, Greene, n. 75; *Allocarya scopulorum*, Greene, nn. 152, 938; *Lappula occidentalis*, Greene, n. 327; *L. ursina*, Greene, n. 471, the species a rare one, but the specimens too young; *Lithospermum Torreyi*, Nutt., or possibly a new species closely allied to it, n. 127; *Oreocarya multicaulis*, Greene, n. 455; *Eritrichium aretioides*, Rydb., n. 845; *Mertensia ciliata*, Don, nn. 189, 403, 486; *M. pratensis*, Heller, nn. 391, 773; *M. Bakeri*, Greene, nn. 293, 497.

LABIATÆ.

Family not strongly represented in the region, only the following having been collected: *Salvia lanceolata*, Willd., n. 679; *Scutellaria galericulata*, Linn., nn. 465, 552, 815; *Mentha Canadensis*, Linn., n. 547; *Dracocephalum parviflorum*, Nutt., n. 599; *Agastache urticæfolia*, Rydb., n. 414; *Stachys scopulorum*, Greene, n. 359.

MONARDELLA PARVIFOLIA. Suffrutescent at base, the many slender tufted stems a foot long more or less, decumbent at base, or more depressed, subcinereous-puberulent: leaves mostly ovate-lanceolate, some oblong-lanceolate, all entire, obtusish, nerveless except as to the quite distinct midvein, obscurely puberulent, closely glandular-punctate, small, half as long as the internodes, the largest seldom $\frac{1}{2}$ inch long including the short petiole: heads about $\frac{3}{4}$ inch broad; bracts scarcely colored, somewhat strigosely pubescent along the veins and densely white-ciliate all around the margin: nerves of the calyx strigose-hairy, the short teeth densely but shortly setose-hirsute: corollas lilac-purple.

Frequent in the cañon of the Gunnison near Cimarron, where it was first collected by myself in 1896, and now again by Mr. Baker, n. 678. The species may probably include the so-called *M. odoratissima* of southern Utah.

SCROPHULARIACÆ.

CASTILLEIA COGNATA. Near *C. linariæfolia*, as tall and as nearly glabrous, but in habit strict, the leaves both shorter and suberect rather than spreading; flowers only half as long as in that species, and crowded, forming a spike both narrow and dense: floral bracts less deeply trifid and their segments very unequal, the middle one much the longest, oblong, obtuse, the others both short and narrow, the whole

bract villous: calyx deeply cleft anteriorly; galea of the corolla shorter than the tube.

Border of a meadow, at Jack's Cabin, 7 July, n. 616. The collector notes that he saw but one plant, but does not mention the occurrence of other species of the genus in that vicinity. That the bracts and calyx are cream-colored, instead of crimson, is one of several hints given in the aspect of the plant, of a possibly hybrid parentage between *C. linariæfolia* and *C. septentrionalis*.

PENTSTEMON TEUCRIOIDES. Suffrutescent, low, the slender tufted stems erect, 2 to 5 inches high, leafy throughout and floriferous from below the middle, the whole herbage cinereous-pubescent: leaves spatulate-linear, entire, almost pungently acute, less than $\frac{1}{2}$ inch long, usually exceeding the internodes: flowers 5 or more in each subcapitate and short-pedicelled glomerule, all forming as it were a secund raceme along the upper one-half and more of the stem: segments of the calyx subulate-lanceolate, acute, entire, wholly herbaceous: narrow and strongly bilabiate deep-purple corolla about $\frac{3}{4}$ inch long, glabrous; sterile filament bearded almost from the base with orange-yellow hairs; anthers glabrous.

Collected at Sapinero, 19 June; said to be common there, on dry ground, n. 186. The specimens are not well in flower; and the aspect of the plant, particularly as to its inflorescence, is singularly like that of a *Teucrium*.

PENTSTEMON PROCUMBENS. Suffrutescent, low and rather slender, the older and more woody parts of the branches prostrate and rooting, the leafy and floriferous parts assurgent, the whole 6 to 10 inches long; branchlets retrorsely puberulent, as also the pedicels and calyx. but leaves green

and almost glabrous, these many, only $\frac{1}{2}$ inch long but rather exceeding the internodes, spatulate-obovate, obtuse or some of the earliest obcordate-notched, entire, those below the inflorescence with some fascicled smaller ones in their axils, the upper with 1 to 3 flowers in their axils: calyx parted deeply into linear-liguliform abruptly acutish and minutely ciliolate lobes: corolla elongated and narrow; anthers glabrous.

Forming large mats on open slopes at Keblar Pass, 7 Aug., n. 733. The species is related to *P. cæspitosus*. It may possibly be identical with Gray's so-called var. *suffruticosus* of that species; but of that I have seen no specimens, and the description is insufficient for the identification of a species.

COMPOSITÆ.

SENECIO CONTRISTATUS. Stems several, stout, erect, 2 feet high or less, leafy up to the simple raceme of several large nodding rayless heads: lowest leaves with an elliptic blade 3 inches long and a broadly winged petiole half as long, the cauline more lanceolate, subsessile or sessile, all closely callous-denticulate, scaberulous between the callosities, otherwise glabrous, like all other parts of the plant: heads broadly campanulate, $\frac{3}{4}$ inch high, the lanceolate acute bracts of the involucre of a very dark red-brown, the inner ones with obvious yellow scarious margin: rays none, disk light-yellow.

In small clumps on open ground at Keblar Pass, 14 Aug., n. 787. An interesting addition to that small group of Rocky Mountain species marked with few and large rayless heads. This one is, however, more nearly allied to the southern *S. Rusbyi* than to its near neighbor, *S. scopulinus*.

SENECIO PYRRHOCHROUS. Erect, stoutish, 2 feet high,

glabrous, rather copiously leafy toward the base, remotely bracted above the middle: lower leaves oval, obtuse, coarsely but rather lightly crenate, 2 or 3 inches long, on slender petioles of 4 or 5 inches, the middle cauline lyrate-pinnatifid and the bracts above them similar but reduced and sessile: terminal cymose corymb like that of *S. aureus*, but the heads larger, the campanulate involucre 4 or 5 lines high: flowers of both disk and ray fiery-red.

Common in meadows at Jack's Cabin, 25 July, n. 612. A very handsome subspecies of *S. aureus*, with large leaves very regularly crenate all around the margin; the flowers of the richest fire-red. Mr. Baker's n. 348 from meadows near Sargent, not yet in full flower at date of July 5, must also be referred here, though in some of these specimens the lowest leaves are subcordate, and many of them almost entire.

SENECIO LAPATHIFOLIUS. Stems clustered, stout, more or less decumbent, a foot high or more, leafy throughout, the herbage deep-green and glabrous: leaves 4 to 6 inches long, lanceolate, acute, sessile by a broad, or sometimes tapering half-clasping base, undulate, more or less obviously denticulate: heads 5 to 10, large, the campanulate involucre more than $\frac{1}{2}$ inch high, mostly arising singly from the axils of the leaves, these on very long peduncles, the whole forming a loose subcorymbose panicle; bracts of involucre lanceolate (rather broadly and triangularly so): rays narrow, about as long as the bracts: achenes striate, glabrous.

On the divide between Ouray and Telluride, 10 Aug., n. 738. In some ways suggestive of *S. crassulus*, and doubtless allied to it, but in character very different. The long peduncles are peculiarly turbinate-thickened under the involucre, and the whole plant appears to be much more succulent than *S. crassulus*.

SENECIO PENTODONTUS. Dwarf, multicapitous, the scapiform peduncles 3 to 5 inches high, the tufted and upright leaves scarcely half as high, these subcoriaceous, their obovate-spatulate obtuse mostly 5-toothed (often 3-toothed, or even quite entire) blades commonly about as long as the petioles; growing parts of the plant hoary-tomentulose, the older foliage glabrate: peduncles with one or more narrow bracts and bearing mostly 3 slender-pedicelled heads; involucre subcylindric, nearly $\frac{1}{2}$ inch high, their bracts thin, narrowly lanceolate: rays few, yellow, oblong, shorter than the involucral bracts.

On open knolls below the limit of trees, near Carson, 2 July, n. 309. An interesting subalpine *Senecio* which may be regarded as in a manner intermediate between two such different species as *S. petrocallis* and *S. werneriaefolius*.

The other *Senecios* of the sets are the following: *S. admirabilis*, Greene, 732, 875, both fine specimens; *S. amplexans*, Gray, 719, 771, also beautifully illustrating this species; *S. atratus*, Greene, ? 756, the foliage too thin and too faintly dentate, perhaps almost as near *S. milleflorus*; *S. blitoides*, Greene, 341, 755; *S. carthamoides*, Greene, 731, 851, both numbers excellent; *S. chloranthus*, Greene, 523, not exactly typical; *S. crassulus*, Gray, 774; *S. eremophilus*, Rich, 596, 748; *S. Fendleri*, Gray, 516, an unusual state with no pinnatifid leaves, 857, quite nearly typical; *S. flavulus*, Greene, 114, 176; *S. Holmii*, Greene, 729; *S. integerrimus*, Nutt., 44; *S. lactucinus*, Greene, 772; *S. milleflorus*, Greene, 525; *S. mutabilis*, Greene, 19, 33, 180. *S. petrocallis*, Greene, 770; *S. pudicus*, Greene, 683, 858; *S. spartioides*, Torr. & Gray, 446.

ARNICA LANULOSA. Gregarious by horizontal root-stocks, the many stems rather low, 5 to 10 inches high, stoutish,

very leafy, all the leaves, even the upper cauline, greatly exceeding their internodes, all lanceolate, entire, the longest 3 or 4 inches long including the short petiole, villous-lanate on both faces but most so beneath and there notably parallel-veined, also minutely viscid-glandular beneath the indument, the stem more woolly: heads 3 to 5, short-peduncled, bracts of campanulate involucre biserial, lanceolate, obtusish, appressed-silky but sparsely so: rays small, deep-yellow: disk-corollas with very long densely villous and sessile-glandular tube and very short narrow limb: achenes hirtellous and also minutely glandular; pappus long, very fine, merely scabrous, dull-white.

On shelving banks of Crested Butte, n. 336, and at Marshall Pass, n. 881. Related to *A. incana* and *A. Bernardina*, especially the last, but stout and low, the leaves quite entire, the disk-corollas and the pappus both characteristic.

ARNICA SILVATICA. Stoutish, a foot high or more, with 4 or 5 pairs of leaves mostly large and surpassing the internodes, the stem loosely pubescent, the leaves very sparsely clothed with short appressed hairs and clammy with copious minute sessile glands: radical leaves none, lowest pair round-obovate and small, the pair next succeeding very large, obovate, the upper pairs lance-ovate, all more or less connate-sheathing and coarsely dentate: peduncles 3 to 5, terminal and axillary: involucre campanulate, nearly $\frac{3}{4}$ inch high, the narrow bracts thin, somewhat villous and decidedly viscid: rays large, deep-yellow; disk-corollas with short soft-villous tube and longer funnelform limb: achenes sparsely villous-hirsute, in no degree glandular; pappus light-tawny.

In woods of spruce at Ruby, 8 July, n. 715. A plant with much the general aspect of *A. latifolia*, though lower

and stouter, but quite distinct by characters of pubescence, flower and fruit.

ARNICA PARVIFOLIA. Stems usually 3 or 4 from the end of the rhizome, mostly 8 or 10 inches high and monocephalous, each with about 3 pairs of small leaves, the petioles of these and also the stem and peduncles loosely villous and somewhat viscid: lowest leaves subcordate-ovate, remotely and often repandly dentate, the cauline with rhombic-lanceolate acute blade 1 to $1\frac{1}{2}$ inches long, the lower ones petiolate, the upper sessile: involucre narrow-campanulate, more than $\frac{1}{2}$ inch high, its lanceolate bracts viscid-pubescent: rays large, golden-yellow, deeply tridentate: slender achenes with short scattered bristly hairs and many minute dots; pappus clear white.

Marshall Pass, at 10,000 ft., 19 July, n. 515. Related to *A. cordifolia*, much like it as to flower and fruit, but of different habit and foliage.

HELIANTHUS FASCICULARIS. Perennial, rather slender, the solitary stem 2 or 3 feet high from a fascicle of small fusiform tuberous roots, glabrous or sparsely pubescent, glaucescent: leaves opposite, narrowly and acuminate lanceolate, remotely and lightly serrate, triple-nerved below the middle, scabrous on both faces with short pustulate acute hairs, 3 to 6 inches long, on petioles of an inch or less: heads 1 to 3, the broadly campanulate involucre of lanceolate and subulate mostly appressed bracts strigose-pubescent and ciliate: achenes oblong, glabrous, about $2\frac{1}{2}$ lines long, the ovate-acuminate lacerate-toothed paleæ more than half as long.

So far as known first collected by myself at Cimarron, Colorado, 3 Aug., 1896; but it is now in Mr. Baker's collection

from Gunnison, n. 816. The propagation is by a few runners from the crown of the fascicled roots.

TETRANEURIS INTERMEDIA. Perennial, cæspitose, the slender peduncles 6 to 8 inches high, rarely bractless, usually with one or more leafy bracts below the middle, not rarely parted below the middle into two branches each monocephalous: leaves comparatively short, narrowly spatulate-linear and linear, green and glabrate or with a few scattered very long pilose hairs on the lower face or near the margin, rather notably punctate: peduncles more or less villous, canescently so under the involucre, this small, its oblong acutish bracts villous-lanate: paleæ of the pappus ovate oblong, conspicuously awned.

Dry hills at Cimarron, southern Colorado, 6 June, 1901, C. F. Baker, n. 34. Intermediate between the acaulescent and caulescent species of the genus.

PSILOSTROPHE BAKERI. Herbaceous, apparently perennial, much branched, 4 to 8 inches high, the branches at earliest flowering not much exceeding the large spatulate-obovate or -oblong green but thinly villous-lanate large basal leaves, these obtuse, entire, some of the cauline coarsely toothed or 3-lobed at or near the apex, all obviously 1 to 3-nerved: branches short, almost divaricate, the breadth of the plant greater than its height: heads scattered, very large, apparently always 5-rayed and the rays more than $\frac{1}{2}$ inch long, deeply 3-lobed: bracts of involucre green-herbaceous, obviously distinct, their tips spreading: achenes glabrous, closely and strongly striate; paleæ of the pappus oval, obtuse, more or less toothed across the summit, little longer than broad, not half as long as the achene, nor a third as long as the corolla.

Near Montrose, southwestern Colorado, 4 June, and near Grand Junction, 11 June, 1901, C. F. Baker, nn. 14 and 106. Species strongly marked both in habit and characters of fruit.

HYMENOPAPPUS OCHROLEUCUS. Perennial, the stoutish caudex branching, each branch with a tuft of petiolate leaves and a subscapiform though branched and corymbose stem 12 to 18 inches high; herbage white-floccose when very young, the stem and fully developed foliage more or less completely glabrate: principal leaves 4 or 5 inches long, pinnate or more or less completely bipinnate, *i. e.*, some of the segments entire, only those below the middle of the rachis parted into one or more segments, all linear: loosely subcorymbose heads 12 to 20, broadly turbinate, $\frac{1}{2}$ inch high: corollas whitish or cream-color: paleæ of the pappus rather many and narrow, little exceeding the silky-villous indument of the achene, and of hardly half the length of the corolla-tube.

Dry hillsides about Cimarron, Colorado, June, 1901, C. F. Baker, nn. 25 and 269.

HYMENOPAPPUS PARVULUS. Tufted stems many on a branching perennial caudex, leafy at base only, rather slender, 5 to 9 inches high, bearing a few subcorymbose small heads at summit: leaves canescently tomentose, once or twice pinnately parted into linear segments: turbinate heads only 3 or $3\frac{1}{2}$ lines high; bracts of involucre oblong-obovate, mainly green and tomentulose but with light-green subscarious margin: corollas greenish-yellow: achenes with short-villous and spreading pubescence; paleæ of pappus 7 to 9, cuneate-obcordate, longer than the corolla-tube, the midvein prominent below, the organ otherwise thin-hyaline.

On dry stony ground in the lowlands about Gunnison, nn. 449 and 840.

ARTEMISIA BAKERI. Allied to *A. Mexicana* but more slender, and with the tufted stems decumbent or depressed and also rather loosely branching: foliage rather sparse, green and glabrous above, white-tomentose beneath, the lower leaves with few and rather remote pinnate segments, those of the branchlets entire, all linear or with linear segments, the margins narrowly revolute: heads in an ample and loose panicle, many of them short-pedicellate, campanulate, the outer bracts short, herbaceous, acute, the inner obtuse and largely scarious, all somewhat arachnoid-canescient.

This species, very well marked as to habit, was first collected by myself, in the cañon of the Gunnison, near Cimarron, Colorado, in August of 1896. Mr. Baker now distributes it, and from the original station, or near it, under n. 698.

ERIGERON SIMULANS. Near *E. pumilus* and of the same size and habit, the many short stems crowning the taproot almost or altogether herbaceous; the spatulate-linear leaves strongly and very stiffly hispid-ciliate from the base to the middle, the upper portion (or proper blade) with a finer strigose hairiness closely appressed: pedunculiform monocephalous branches sparingly leafy below, slender and naked under the involucre, this green and as if glabrous to the unaided eye, but its outermost bracts sparsely bristly-hairy: rays pale flesh-color or white: outer pappus very conspicuous, of oblong-obovate acutish laciniate-toothed paleæ.

Stony hills about Cimarron, southern Colorado, 6 June,

1901, C. F. Baker, n. 40. The plant so closely simulates, habitally, the common but always more northerly *E. pumilus*, that but for its very remarkable double pappus it would have been let pass for that species. But upon examination its pubescence is of another character, and the whole plant is greener and more slender.

PLANTAGINACEÆ.

PLANTAGO RETRORSA. Perennial, of the size and with the habit of *P. eriopoda*, and with even a closely similar pubescence, but wholly wanting the fuscous woolliness, which so conspicuously marks that species, the leaves not entire but coarsely though sparsely runcinate-toothed below the middle: sepals much more herbaceous, and capsules more elongated; seeds elliptic-oblong.

Abundant in alkaline meadows at Doyle's, 28 June, n. 627. Excellently marked by the four characters indicated, as distinct from the kindred species, with which it may have been confounded, if before collected; but the plant is wholly new to me.¹

NYCTAGINACEÆ.

ABRONIA BAKERI. Allied to *A. fragrans*, but much smaller, and suffrutescent, the stems and branches, both the woody

¹*P. SHASTENSIS*. Also allied to *P. eriopoda*, and with definite traces of its basal woolliness, but leaf-outline and leaf-texture very different, all being comparatively thin, not at all ceriaceous, and the outline distinctly obovate, the whole margin apt to be more or less repand-toothed: spikes relatively short, and much more dense than in *P. eriopoda*; capsules almost globose and not exceeding but even quite included within the calyx, the sepals of which are largely herbaceous, and their narrow scarious margins distinctly ciliolate all around: seeds oval.—Species known to me only as collected by myself on the plains of Shasta River in Northern California, twenty-five years since. They were distributed for *P. eriopoda*, but are now seen to represent something very distinct.

and the herbaceous ones, glabrous and very glaucous: leaves much smaller than in *A. fragrans*, subcordate-orbicular to oval, very obtuse, usually about an inch long, on petioles somewhat longer or shorter: flower smaller than in *A. fragrans*, the perianth-limb apparently funnelfrom rather than rotate: fruits scabrous on the sides, roughish-tomentulose at summit.

This species, easily distinguished from the northern and true *A. fragrans* (a large perennial, wholly herbaceous) by its small size, suffrutescent habit, white stems and total lack of clamminess, is well represented in the following numbers: 13, obtained at Montrose, best showing the half-shrubby growth; 89, from Deer Run, somewhat larger, and 92, from Grand Junction; this last, at least in my set, is a young plant, flowering perhaps the first year from the seed, and thus exhibiting, naturally, no sign of the ultimate woodiness of the stem.

ALLIONIA ROTUNDIFOLIA. About a foot high, the stoutish clustered stems ascending, densely crinite-hirsute as to the lower and shorter internodes, the upper portions, as well as the lower face of the uppermost leaves more loosely and hispidly hirsute: lowest leaves suborbicular, obtuse, about $1\frac{1}{2}$ inches long, the upper larger, sometimes round-ovate, all more or less woolly-ciliolate: flowers and fruits not seen.

Obtained at Swallow's, between Pueblo and Cañon City, 1 June, n. 3. The specimens, though not yet in flower, exhibit in their peculiar foliage and pubescence characters sufficient for the establishment of a species. The inflorescences are clustered, and arise from the axils of only the uppermost leaves.

PAPILIONACEÆ.

THERMOPSIS PINETORUM. Less than a foot high at flowering, in age rather taller; oblong and obovate-oblong leaflets

1½ to 2 inches long, obtusish, sparsely appressed-hairy beneath, glabrous above; stipules ovate, 1 to 1½ inches long; racemes short and few-flowered, even subcapitate, the corollas large; calyx villous, its triangular teeth half as long as the tube: pods about 3 inches long, ascending, straight, appressed-pubescent.

At Marshall Pass, common in open places among the pine woods, 19 July, n. 485; flowering specimens only; but the fruiting specimens, from precisely the same locality, were obtained by myself, 4 Sept., 1896, and have been kept ever since, under the above name as a new species, awaiting flowering specimens.

THERMOPSIS STRICTA. Much taller, even 1½ feet high in flower, very strict, and with a long interrupted raceme of smallish flowers of which the lowest are subverticillate: mature leaflets 1¾ to 2½ inches long, mostly oblong or elliptical, some of the largest inclining to oblanceolate, glabrous above, sparsely pubescent beneath; ovate stipules 1 to 2 inches long: calyx canescently villous, its teeth narrower, more than half the length of the tube: pods very erect, 2 inches long or more, villous-tomentose.

In meadows at Sapinero, 19 June, n. 173, in flower; also at Gunnison, 25 July, n. 604, in fruit.¹

¹ **T. ANGUSTATA.** Two feet high and somewhat bushy by several well developed leafy sterile branches, but only the main stem bearing flowers: leaflets about 2 inches long, elliptical, deep-green, villous-pubescent beneath (as also the stem), but glabrous above; stipules small and narrow, barely 1 inch long, or even less, and lanceolate: calyx and pods hoary-tomentose, the latter about 2 inches long, strictly erect.—Known only as collected by myself, at Star Valley, in the foothills of the Ruby Mountains, Nevada, 20 July, 1896. The specimens are in fruit only, but by the remarkably narrow, and almost exactly elliptical foliage, and the tomentose pods, a marked species is indicated.

LUPINUS RUBRICAULIS. Perennial, the tufted stems slender, a foot high or more, simple, remotely leafy with rather small very slender-petioled leaves, both stem, petioles and, in part the leaves dark red-purple and sparingly and minutely silky-villous: leaflets about 7 or 8, cuneate-oblong or elliptical, unequal, the largest $1\frac{1}{2}$ inches long, the slender petioles much longer; stipules small, subulate: raceme sessile, 3 or 4 inches long, rather dense, the flowers scattered, middle-sized, pedicels and very gibbous calyx white-silky; corolla dark blue-purple, banner shortest of all the petals, the narrowly pointed falcate keel longest and naked: fruit not seen.

On moist slopes of Crested Butte, 6 July, n. 342; conspicuous by the dark purplish hue of the herbage, and in habit quite an elegant species.

LUPINUS ARCEUTHINUS. Stems rather rigidly erect, forming large tufts 3 feet high, simple and very leafy, hoary-pubescent throughout, the stem with a villous, the leaves with a more short and appressed silky-velvety indument: leaflets 7 or 8, lance-elliptical, acute, the largest 2 inches long; raceme sessile, 6 inches long, rather dense, all the flowers scattered, rather large; stout pedicels, and short gibbous calyx scarcely more velvety than the rachis; corolla wholly dark blue-purple, the petals subequal, the not strongly falcate keel densely woolly-ciliate throughout: pods more than an inch long, quite broad, velvety-tomentose.

At Cedar Edge, 24 June, n. 246.

LUPINUS DICHROUS. Size and habit of the last, with similar though somewhat larger foliage, the pubescence both shorter and more scanty, perhaps best described as silvery-

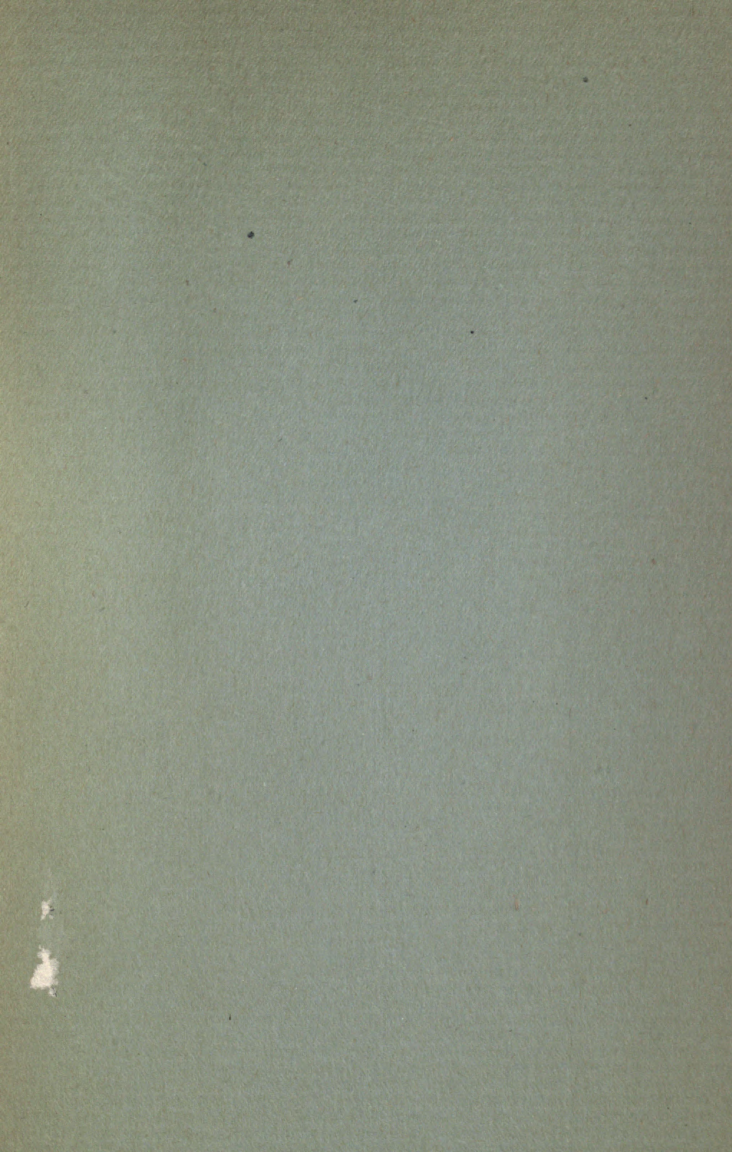
canescent; raceme short-peduncled, less elongated, open and subverticillate; pedicels and short gibbous calyx velvety: corolla at first white, the banner only at length changing to reddish-purple, this rather shorter than the other petals; keel rather broadly lunate and not long-pointed, strongly woolly-ciliate throughout: pods oblong-linear, $1\frac{1}{2}$ inches long, silky-tomentose, 5-seeded; seeds flat, white.

Also at Cedar Edge, 24 June, n. 249; the strictly two-colored rather large corollas rendering the plant very attractive.

LUPINUS AMPLUS. Stems clustered, stout, 3 feet high, very leafy with leaves of the largest dimensions, the thin elliptic-lanceolate acute leaflets about 10 and 3 to 5 inches long, green and glabrous above, sparsely appressed-silky-hairy beneath and more strongly so on the margin; the stem and peduncles villous: raceme sessile, 10 inches long, both broad and rather dense, nowhere subverticillate: pedicels $\frac{1}{2}$ inch long or more, densely hirsute, as also the short calyx: corolla of the largest, $\frac{3}{4}$ inch long; banner shortest, dark-purple; wings violet, conspicuously striate-veined with purple; keel falcate, slender-pointed, hirtellous-ciliate above the middle: pods not seen, but ovaries silky-tomentose.

At Cerro Summit above Cimarron, 17 June, n. 164. Very large and showy, recalling *L. magnus* of the Californian seaboard, almost as large, but not succulent; and quite as distinct from the far-northwestern *L. polyphyllus*.

LUPINUS LEPTOSTACHYUS. Clustered stems stout, very erect, 2 feet high or more, with relatively small leaves and the smallest of flowers in very long racemes: leaflets about 9, oblong-linear, abruptly acute, unequal, the longest $1\frac{1}{2}$



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